

Real Time

Electrical and Computer Engineering Department
The University of Alabama in Huntsville

Volume 3, Number 1

Spring 1999

Chair's Corner



Dr. Reza Adhami

After serving the ECE Department for one year, as Interim Chair, I have been entrusted with the responsibility of leading the Department into the 21st century. As Professor and Chair of the ECE Department, I will work with faculty, UAH administrators, and industry leaders to build upon the solid foundation of the Department that previous Chairs have established.

During the next 4 years, my plan is to lead the ECE Department to higher national ranking in both research and instruction. This goal can be achieved through: improved interaction with local industry and government agencies; recruitment of high-quality students; improved undergraduate and graduate education; upgraded instructional labs that include more state-of-the-art equipment; development of world-wide-web courses and utilization of the Internet for distance learning, employment of more faculty essential to areas such as computer communications/networks, VLSI, computer hardware/software, wireless communications, and signal processing; increased high quality publications, increased funded research, and increased communication with Alumni.

Progress has been made in the area of interaction with industry and government agencies: funded research has been increasing; special Masters' programs have been provided to educate

employees in certain areas essential to industry. A special Master's program is tailored to specific needs of industry by combining our existing courses and introducing new courses if necessary. Distance learning classes are also available for those who prefer to conduct classes at their site.

We will continue improving our undergraduate and graduate education by introducing new courses and by emphasizing the relevance of theory to practical problems. We have already started this by offering EE100, Concepts in Digital Signals and Systems. In this course, we take a bottom-top approach teaching students the need for mathematics and providing them with an overview of Electrical and Computer Engineering concepts.

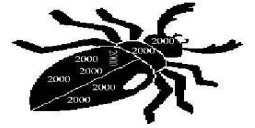
For example, to introduce students to the matrix theory and its applications in electrical engineering, we take an image (2-dimensional array) and manipulate it by doing some processing such as edge detection and noise removal. These operations are very trivial and can easily be understood by students who have had a pre-calculus course, which is a prerequisite to EE100. In addition, students are introduced to basic elements of electrical and computer engineering by utilizing software application such as Electronics Workbench. They learn how to derive basic laws in electrical and computer engineering subjects. Comments provided by some students are provided in this newsletter.

The past few months have been quite eventful for the ECE Department at UAH. We were notified by the Accreditation Board for Engineering and Technology (ABET) that all ECE Programs, Electrical Engineering (EE), Computer Engineering (CPE), and Optical Engineering (OPE), have received continuation of accreditation. It gives us great pleasure to inform you that our Department now has the first ABET-accredited Optical Engineering program in the world. Two new faculty, Dr. L. Joiner and Dr. Emil Jovanov, joined the Department. The SEDSAT-1, a satellite designed and built by a team of students and faculty, was launched into space in late October 1998 from Cape Canaveral. The Department has received several research and equipment awards. Dr. Peter Brackett, Dr. Mervin Budge, Dr. Chester Carroll, and Dr. Stephen Gilbert were named Adjunct Professors of the ECE Department. We are excited about their appointments with the ECE Department and look forward to working with them. Finally, we are pleased to announce that Dr. Jorge Aunon, our new Dean, is also a Professor of Electrical and Computer Engineering.

-Reza Adhami, Chair

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Millennium Bug Or Y2K



How may this happen? You have been hearing a lot about the Year 2000 computer problem, sometimes called the Millennium Bug, or Y2K. Do you know who created the Bug and what it might do to us in less than a year from now or even earlier? One potential problem may stem from the BIOS (basic input/output system) of the computer.

The BIOS is a series of programs that are stored in the ROM (read only memory) of every computer. The BIOS contains the Power-On Self test (POST), which executes automatically every time you turn on the computer. In addition, the BIOS contains interfaces to the various hardware devices such as the real-time clock (RTC). The date and time is read from the RTC and a copy is maintained for use by software applications, sometimes including the operating system. The problem starts when an RTC reports a 2-digit year instead of a 4-digit year, as is the case for older systems. In our calendar, a year is defined using 4 digits, so when an RTC reports a 2-digit year, those two digits are taken to be the last 2 digits of the 4-digit year. The first 2 digits of the year are then assumed by the software application and operating system to be "19." For example, a 2-digit report of 98 is interpreted as 1998 by the software. Likewise a 2-digit year of 00 will be interpreted as 1900. Ouch!

-Continued on page 2

New Dean

The College of Engineering now has a permanent dean. Dr. Jorge Aunon assumed his responsibility as Dean of the College of Engineering at UAH effective January 1, 1999. Prior to this appointment, Dr. Aunon served as the Dean of the College of Engineering and a Graduate Professor in the Department of Electrical Engineering at Texas Tech University in Lubbock, Texas. He received his B. S., M.S., and D.Sc. degrees in engineering from George Washington University in Washington, D.C. Before joining Texas Tech, he was a professor and head of the Electrical Engineering Department at Colorado State University.

Prior to joining the Colorado State faculty, he was an Electrical Engineering Professor at Purdue University for 15 years. Dr. Aunon was a Visiting Professor of Electrical Engineering at the Universidad Autonoma Metropolitana in Mexico City. He has served as a Research Associate in Pediatric Neurology at George Washington University Medical Center. In addition, he was a Fulbright Scholar in 1989 at the Institute of

Cybernetics in Barcelona, Spain. Dean Aunon has been honored as a Fellow of the Institute of Electrical and Electronics Engineers (IEEE) for his contributions to the field of biomedical signal processing. His research involves testing visual and auditory systems on human beings to determine if people learn better if they receive the same information both visually and by hearing.

Comments or questions can be sent to:

UAH
The University of Alabama in Huntsville

Visit Our Web Site
www.ece.uah.edu

The Dynetics, Inc. Endowed Scholarship Recipient Announced



Christina E. H. Arrington

This year, the Dynetics, Inc. Endowed Scholarship has been awarded to Christina E. H. Arrington. Christina is a summa cum laude graduate of UAH having received her B.S.E. in Electrical Engineering in August 1998. She is enrolled in the ECE graduate program, currently doing research under the supervision of Dr. Reza Adhami. As a Graduate Teaching Assistant she teaches a section of EE100, a new course developed by Dr. Reza Adhami to help introduce students to Electrical and Computer Engineering concepts.

As a student at UAH, Christina participated in the Co-op program for three years and was named first runner-up in the 1997 Co-op of the Year competition. She worked at Computer Sciences Corporation (CSC) where her main project was to develop a graphical user interface (GUI) for the Interactive Distributed Engineering Evaluation Simulation (IDEEAS). IDEEAS is a battlefield simulation program designed to evaluate future weapon system technologies for the Army's Rapid Force Projection Initiative (RFPI).

Christina has been an active member of academic societies such as Tau Beta Pi and Eta Kappa Nu, serving as an officer in each of these societies. She spent two years on the UAH women's rowing team, competing in regattas at Clemson, Chattanooga, Knoxville, and Atlanta.

A 1993 graduate of the Mississippi School for Mathematics and Science and member of the MSMS Hall of Fame, Christina chose to attend UAH because, she explains, "I was really impressed with the amount of opportunities in Huntsville. I chose UAH because of its strong engineering and research opportunities, but also because I knew that I would enjoy living in Huntsville."

The Dynetics, Inc. Endowed Scholarship was designed to reward scholarship and hard work, and to afford students the opportunity for financial support while pursuing a graduate education.

Congratulations Christina!

You're Invited!

Bits and Bites '99

UAH

Optics Building, Room 235

Friday, April 9, 1999, 12 noon

If you would like to learn more about ...

What do engineers do?

What do engineers study?

Why students should consider studying Electrical, Computer, or Optical engineering at UAH!

pizza!

pizza!

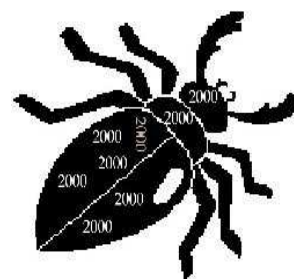
pizza!

More info: phone (256) 890-6316,

email: ece@eb.uah.edu



Dr. Nagendra Singh explains a new course on Antennas and Propagation in Telecommunications for the Spring 1999 semester. The course is geared for undergraduate seniors and beginning graduate students. The course will cover a range of topics on antennas and propagation useful in Telecommunications. Topics in propagation will be particularly useful for wireless communications. The topics on antennas will include laboratory experiments; the measurements will be performed using the Lab-Volt Antenna Training and Measuring System recently acquired by the ECE Dept.



Millennium

Bug or Y2K (cont. from page 1)

Now what? Is it time to panic? It depends. The fact is that individuals who use their computers for word processing and browsing (which covers more than 50% of the users) should not worry at all. However, if business computers fail to correct the problem, there are implications for everyone and that's when you should panic. If you're aged 20 now, that means you were born in 1979, in less than a year's time (year 2000) the current date may be interpreted as 1900 which means you have to wait 79 years to be born again. The danger is that many systems making decisions based upon your age may misinterpret your age and you may suffer or benefit as a result of this Bug. No matter what happens, the problems will be observed and corrected by those who created them.

-Reza Adhami, Chair

NSF Research Opportunities for Undergraduates

The aim of the National Science Foundation is to promote and advance scientific and engineering progress in the United States. This requires continuing efforts to attract a diversified pool of talented students into research careers in these fields, and to help ensure that they receive the best education possible. The undergraduate years are critical in the educational sequence, as career-choice points and as the first real opportunities for in-depth study.

To achieve these objectives, the National Science Foundation funds leading Research Institutions to provide research experience to talented undergraduates from regional universities and colleges, in scientific and engineering disciplines. NSF is particularly interested in increasing the participation in research of women, minorities and persons with disabilities. Recently, the Electrical and Computer Engineering Department at the University of Alabama in Huntsville received support to provide research experience to undergraduates in the area of performance measurement and evaluation of multithreaded systems. This project is directed by Professor Krishna Kavi with the aid of Professor William Cohen.



This REU-Site at UAH will provide educational and research opportunities that are not available at their home institutions to undergraduates at various regional institutions.

The project provides summer support for talented and motivated undergraduates in Computer Engineering, Computer Science or Electrical Engineering to spend 12 weeks at the University of Alabama in Huntsville to gain experience in parallel processing, multithreaded programming, measuring and fine-tuning multithreaded applications and aid the project directors in their on going research.

Selected students will be paid a stipend of \$3000 for the 12-week period. A small amount to cover travel to UAH may also be considered based on need and availability of funds.

Students will be required to attend a 3 semester-hour course on parallel processing. Arrangements can be made with their home institutions to transfer the 3 credit hours towards their degree programs.

Only current students who will return to their home institutions for at least one more semester are eligible to apply. Preference will be given to

juniors and seniors with good C, C++ and Unix programming background. The program is available only to citizens and permanent residents of the U.S. Interested persons should contact Dr. Krishna Kavi (email: kavi@ece.uah.edu, phone: 256-890-6380).

Applications will be made available in February 1999 and candidate selections will be completed by April 1999. The summer 1999 program will start on May 17, 1999. Students may be required to arrive at UAH prior to this date to complete paperwork.

A New Course

Introduction To Parallel Programming

The parallel programming course will concentrate on techniques for developing multithreaded (and multiprocessing) implementation of various applications. Students will be exposed to issues of synchronization, data partition, parallelizing DOALL and DOACROSS loops. We will use Pthreads as the primary means of implementing multithreaded programs. Optionally, students can choose other languages or systems for programming, including OpenMP Fortran, Java and Cilk.

Course Outline:

1. **Parallel Processing Models:** Message Passing vs. Shared Memory; Explicit and implicit communication constructs; Multithreading vs. Multiprocessing; Programming examples using OpenMP FORTRAN, Cilk and Pthreads
2. **Communication and Synchronization:** Synchronization and mutual exclusion in shared memory systems; Cost of implementing synchronization in a shared memory, and distributed shared memory system; Programming Examples using PVM, OpenMP FORTRAN, Pthreads and Cilk
3. **Data and Functional Parallelism:** Issues and Examples; Data distribution and data alignment; Loop unrolling; Programming examples using OpenMP FORTRAN
4. **Parallelization of DOALL and DOACROSS loops:** Allocation of loop iterations to threads; Evaluation of various strategies; Cyclic, chunking, guided, and staggered approaches; Programming Examples using OpenMP FORTRAN
5. **Thread Scheduling Issues:** Preemptive vs. Nonpreemptive models; Programming examples using Pthreads

Prerequisite: Extensive programming background using C and Unix.

EE100 – An Interactive Learning Experience

*“If I hear it, I will forget it.
If I see it, I will remember it.
If I do it, I will understand it.”*
- Chinese Proverb

Read for yourself what students are saying about this course:

“Signing up and taking EE100 was a great choice for me. . . . [This] class was not only a preparation for Electrical Engineering, but also a preparation for Engineering in general . . . I loved the hands-on part of the class. I had a feel of what was going on. . . . It was great to be able to truly see what we were doing and make it happen. . . . Interacting with the teacher and the material being taught made for a more complete understanding of the course.” – **Eric Atkins**



“I learned more than I expected I would and enjoyed learning it more than I thought I would. . . . Most importantly to me, this class taught me quite a bit about computer use – yet I don’t know if this came more from the course material or from the instructor and the open atmosphere of the classes. . . . I guess the biggest difference, compared to some of my other courses, was the good balance between theory and practical application – both were covered and the student wasn’t squashed in between.” - Julian Swann



“EE100 was my first Electrical Engineering course. After completing this course, I realize that Electrical Engineering is definitely what I want to do.” - **Audrey Pilkilton**

“The best thing about this course was the working environment. I have never had a class that took place in front of a computer.” – Jason Allen

“Perhaps the most important thing I learned about in EE-100 was electrical circuits. We discussed how electricity travels through the circuit and how each component effects the flow of electricity through the circuit. We learned how to calculate resistance, voltage and current using Ohm’s law. To further this learning, each student built an electrical circuit project and demonstrated it in class. . . .

Another thing we learned through experience was giving a presentation. Each student was responsible for two presentations on class lectures and a final presentation on the class project. The students were graded by their peers and the feedback was a positive experience for those of us who haven’t had much experience presenting ideas in front of a group of people. This is something I feel will come in handy in the real world as likely the engineer will be required to present his/her work to their supervisors on a regular basis.” – **Kevin McMannon**



“The course EE100 is not just a very informative course. It is also proof of the great things that can be accomplished with technology and small classes. There are three main parts to the course: Matlab, Electronics Workbench, and our projects. The projects were by far the most work and probably the most educational. Not only did I have to figure out how to put the device together; I also had to figure out how it worked and how to explain how it worked. My favorite part of the course was the project because I really liked learning how to put the components together and see how they interact.” – **Marty Leblanc**

“I really enjoyed this class. I learned a lot about the programs that we used. I had a great teacher who made sure we realized the practical use of the things that we learned, as opposed to “taking his word that we would see it again.” The class was upbeat and if there was ever a question, no matter how much I could not comprehend, he did his best to try, at the expense of wasting his precious class time. I learned about things that I never had really paid attention to, like photographs or sounds. I also came to realize that there are many things that electrical engineers are involved in.” – **Ashlee Phillips**



“Being my first year in college, I had no idea what university life would be like. I was repeatedly told that the classes were hard and “it wasn’t High School anymore”. Boy were they right! In honesty, I was dreading the first day in this computer class. As I feared, EE100 was hard, it was very hard . . . But slowly the class began to grow on me. Sure it was hard but something different was happening . . . it became interesting. [A friend and I began to go to the TA for help.] Unfortunately she never gave us the answer directly, she made us learn it. But that was good in a way. It forced us to learn. EE100 became one of my favorite classes.” – **Daniel Miller**

“Of all the courses that I took this semester, EE100 was the one course that gave me an introduction into my major. I had no clue what to expect until I got to our first class and [the instructor] gave us an overview of what we would be covering. Then I got really scared. I never thought that I could make it in this class with all these students that seemed to already know so much more than me. I also started to get nervous about this so called ‘project’ we would be doing and all the presentations we would have to give in front of class. As the year went on, I gradually got more familiar with the new material. I feel that I have learned a lot in this class. I think the project was the most fun for me. With all the nervousness and problems as I worked on it, it turned out to be very successful and I realized that I enjoyed doing it. I enjoyed EE100 and all the people that I got to know. I like [the instructor’s] style of teaching, it kept me interested and [he] applied the material to realistic situations. . . . I felt very mixed feelings, though, in the class. Sometimes I was nervous, confused, frustrated, and just overwhelmed. Yet when I look back on it now that I have survived, I really am happy but realize that this is only the beginning.” – **Ellen Lafiore** is a member of the UAH women’s volleyball team and was recently named East Division Freshman of the Year.



New EE Curriculum: ELECTRICAL ENGINEERING PROGRAM 1998 (130 Hours)

Course Number	Credit Hrs.	Short Title	Changes From Previous Year	Accept From Jr. Colleges	Cr. Hrs
English - 6 hours					
EH101	3	Freshman Composition	None	Yes	3
EE102	3	Freshman Composition	Replaced Technical Writing, EHT 301	Yes	3
Mathematics - 18 hours					
MA171	4	Calculus A	None	Yes	4
MA172	4	Calculus B	None	Yes	4
MA201	4	Calculus C	None	Yes	4
MA244	3	Intro to Linear Algebra	None	Yes	3
MA324	3	Intro to Differential Equations	None	Yes	3
Chemistry - 4 hours					
CH121	3	Gen & Inorganic Chemistry	None	Yes	3
CH125	1	Gen & Inorganic Chem Lab I	None	Yes	1
Physics - 12 hours					
PH111	3	Gen Physics w/Calculus I	None	Yes	3
PH112	3	Gen Physics w/Calculus II	None	Yes	3
PH113	3	Gen Physics w/Calculus III	None	Yes	3
PH114	1	Gen Physics Lab I	None	Yes	1
PH115	1	Gen Physics Lab II	None	Yes	1
Humanities & Social Sciences - 18 hrs					
HU/SS*	3		Replaced ECE239	Yes	3
HU/SS*	3		Replaced PHL392	Yes	3
HU/SS*	3		None	Yes	3
HU/SS*	3		None	Yes	3
HU/SS*	3		None	Yes	3
HU/SS*	3		None	Yes	3
Engineering Core - 12 hours					
EE300	3	Electrical Circuits I	None	No	0
MAE271	3	Statics	None	No	0
ISE321	3	Engineering Economics	None	No	0
E310	3	Solid State Fundamentals	Replaced MAE294	No	0
Electrical Engineering Electives - 18 hours					
EEL301	3	Jr standing Choose one of 407,424,426		No	0
EEL302	3	Jr standing (Upper level ECE course)		No	0
EEL303	3	Jr standing (Upper level ECE course)		No	0
EEL304	3	Jr standing (Upper level ECE course)		No	0
EEL305	3	Jr standing (Upper level ECE course)		No	0
EEL306	3	Jr standing (Upper level ECE course)		No	0
Technical Elective - 3 hours					
TEL301	3		Jr. stdg. (Upper level Engr Course)	No	0
Electrical Engineering Option - 35hrs.					
EE100	3	Concepts in Digital Signals and Sys	Modified to EE100/EE197	No	0
EE197	3	Computer Methods in Engineering	Modified to EE100/EE197	Yes	3
EE202	3	Intro to Digital Logic Design	None	No	0
EE201	1	Digital Logic Lab	Added	No	0
EE301	1	Circuits and Measurements Lab	None	No	0
EE305	1	Electronics Laboratory I	None	No	0
EE307	3	Electricity and Magnetism	None	No	0
EE313	3	Electrical Circuits II	None	No	0
EE315	3	Electronics I	None	No	0
EE382	3	Analytical Methods for Continuous-Time Systems	None	No	0
EE383	3	Analytical Methods for Multivariable & Discrete-Time Systems	None	No	0
EE384	1	Digital Signal Processing Laboratory	Reduced by 1 hour	No	0
EE420	3	Random Signals & Noise	None	No	0
EE425	3	Intro to Control and Robotic Systems	EE382 (or permission of instructor)	No	0
EE448	3	Analytical and Computational...	Replaced MAE396	No	0
Design	3	Choose EE494 or CPE437	Added	No	0
Total	130				60

* A two-course sequence (a total of 6 hours) must be from History or Literature

New CPE Curriculum: COMPUTER ENGINEERING PROGRAM 1998 (134 Hours)

Course Number	Credit Hrs.	Short Title	Changes From Previous Year	Accept From Jr. Colleges	Cr. Hrs.
English - 6 hours					
EH101	3	Freshman Composition	None	Yes	3
EE102	3	Freshman Composition	Replaced Technical Writing, EHT 301	Yes	3
Mathematics - 18 hours					
MA171	4	Calculus A	None	Yes	4
MA172	4	Calculus B	None	Yes	4
MA201	4	Calculus C	None	Yes	4
MA244	3	Intro to Linear Algebra	None	Yes	3
MA324	3	Intro to Differential Equations	None	Yes	3
Chemistry - 4 hours					
CH121	3	Gen & Inorganic Chemistry	None	Yes	3
CH125	1	Gen & Inorganic Chem Lab I	None	Yes	1
Physics - 11 hours					
PH111	3	Gen Physics w/Calculus I	None	Yes	3
PH112	3	Gen Physics w/Calculus II	None	Yes	3
PH113	3	Gen Physics w/Calculus III	None	Yes	3
PH114	1	Gen Physics Lab I	None	Yes	1
PH115	1	Gen Physics Lab II	None	Yes	1
Humanities & Social Sciences - 18 hrs					
HU/SS*	3		Replaced ECE239	Yes	3
HU/SS*	3		Replaced PHL392	Yes	3
HU/SS*	3		None	Yes	3
HU/SS*	3		None	Yes	3
HU/SS*	3		None	Yes	3
HU/SS*	3		None	Yes	3
Engineering Core - 12 hours					
EE300	3	Electrical Circuits I	None	No	0
MAE271	3	Statics	None	No	0
ISE321	3	Engineering Economics	None	No	0
EE310	3	Solid State Fundamentals	Replaced MAE294	No	0
Computer Engineering. Electives - 9 hours					
CEL301	3	300 -and 400-level courses from CPE approved ENG or Sci		No	0
CEI302	3	300 -and 400-level courses from CPE approved ENG or Sci		No	0
CEL303	3	300 -and 400-level courses from CPE approved ENG or Sci		No	0
Computer Engineering Option - 56hrs.					
CPE197	3	Computer Methods in Engineering	None	Yes	3
CPE203	3	Fundamentals of Software Eng.	None	No	0
CPE/EE302	3	Design of Digital Computers	None	No	0
CPE352	4	Operating Systems or CPE454 and 455	None	No	0
CPE403	3	Software Design and Engineering	None	No	0
CPE427	2	Computer Engineering Design I	None	No	0
CPE/EE429	3	Microcomputers	None	No	0
CPE433	3	Advanced Techniques in CPE	None	No	0
CPE437	2	Computer Engineering Design II	None	No	0
CPE/EE468	3	Intro. To Comp. Network or CPE452 RTS	None	No	0
CPE/EE492	3	VLSI Design I or CPE/EE422 Adv. Logic	None	No	0
CS214	3	Discrete Structures	None	Yes	3
CS317	3	Design and Analysis of Algorithms	None	No	0
EE202	3	Intro to Digital Logic Design	None	No	0
EE201	1	Digital Logic Lab	Added	No	0
EE301	1	Circuits and Measurements Lab	None	No	0
EE305	1	Electronics Laboratory I	None	No	0
EE315	3	Electronics I	None	No	0
EE382	3	Analytical Methods for Continuous-Time Systems	None	No	0
EE383	3	Analytical Methods for Multivariable & Discrete-Time Systems	None	No	0
EE420	3	Random Signals & Noise	None	No	0

Total 134 63

* A two-course sequence (a total of 6 hours) must be from History or Literature

***New OPE Curriculum* OPTICAL ENGINEERING (ROUTE A) PROGRAM 1996 (133 Hours)**

Course Number	Credit Hrs.	Short Title	Changes From Previous Year	Accept From Jr. Colleges	Cr. Hrs.
English - 6 hours					
EH101	3	Freshman Composition	None	Yes	3
EE102	3	Freshman Composition	Replaced Technical Writing, EHT 301	Yes	3
Mathematics - 18 hours					
MA171	4	Calculus A	None	Yes	4
MA172	4	Calculus B	None	Yes	4
MA201	4	Calculus C	None	Yes	4
MA244	3	Intro to Linear Algebra	None	Yes	3
MA324	3	Intro to Differential Equations	None	Yes	3
Chemistry - 4 hours					
CH121	3	Gen & Inorganic Chemistry	None	Yes	3
CH125	1	Gen & Inorganic Chem Lab I	None	Yes	1
Physics - 12 hours					
PH111	3	Gen Physics w/Calculus I	None	Yes	3
PH112	3	Gen Physics w/Calculus II	None	Yes	3
PH113	3	Gen Physics w/Calculus III	None	Yes	3
PH114	1	Gen Physics Lab I	None	Yes	1
PH115	1	Gen Physics Lab II	None	Yes	1
Humanities & Social Sciences - 18 hrs					
HU/SS*	3		Replaced ECE239	Yes	3
HU/SS*	3		Replaced PHL 392	Yes	3
HU/SS*	3		None	Yes	3
HU/SS*	3		None	Yes	3
HU/SS*	3		None	Yes	3
HU/SS*	3		None	Yes	3
Engineering Core - 12 hours					
EE300	3	Electrical Circuits I	None	No	0
MAE271	3	Statics	None	No	0
ISE321	3	Engineering Economics	None	No	0
EE310	3	Solid State Fundamentals	None	No	0
Optical Engineering Core - 29 hours					
EE197	3	Computer Methods in Engineering	None	Yes	3
EE307	3	Electricity and Magnetism	None	No	0
EE301	1	Circuits and Measurements Lab	None	No	0
EE313	3	Electrical Circuits II	None	No	0
EE407	3	Electromagnetic Waves	None	No	0
OPE453	3	Laser Systems	None	No	0
OPE455	2	Optical Engineering Laboratory	None	No	0
OPE459	3	Optical Engineering Design	None	No	0
OPT341	3	Geometrical Optics	None	No	0
OPT342	3	Physical Optics	None	No	0
OPT411	2	Geometrical Optics Laboratory	None	No	0
Route A (EE) Courses - 35 hours					
EE202	3	Intro to Digital Logic Design	None	No	0
EE201	1	Digital Logic Lab	Added	No	0
EE305	1	Electronics Laboratory I	None	No	0
EE315	3	Electronics I	None	No	0
EE382	3	Analytical Methods for Continuous-Time Systems	None	No	0
EE383	3	Analytical Methods for Multivariable & Discrete-Time Sys	None	No	0
EE384	1	Digital Signal Processing Laboratory	None, reduced by 1 hour	No	0
EE420	3	Random Signals & Noise	None	No	0
EE426	3	Communication Theory	None	No	0
OPE451	3	Optoelectronics	None	No	0
OPE454	3	Optical Fiber Communications	None	No	0
Elective	6	Choose from OPT, OPE, EE, or CPE	Added	No	0
OPE456	2	Photonics Laboratory	None	No	0
Total	133				60

* A two-course sequence (a total of 6 hours) must be from History or Literature

ECE Summer 1999 Course Listing

Mini Session I

6 Weeks - Dates: 05/17/99 - 06/29/99

www.eb.uah.edu/ece/

CPE & EE Courses

CPE510-01	Introduction to Computer Networks, same as EE510	MTWR	6:00-7:40 p.m.
CPE510-02	High Performance Computing I	MTWR	4:00-5:40 p.m.
CPE410-01	Introduction To Parallel Programming	MTWR	9:00-10:40 a.m.
CPE510-03	Introduction To Parallel Programming	MTWR	9:00-10:40 a.m.
EE510-01	Introduction to Computer Networks	MTWR	6:00-7:40 p.m.
EE 510-02	High Performance Computing I	MTWR	4:00-5:40 p.m.
EE601-01	Linear Systems	MTWR	6:00-7:40 p.m.
EE700-01	Samples Data Control	MTWR	6:00-7:40 p.m.
EE710-01	Electronics Counter Measurements, ECM	MTWR	4:00-5:40 p.m.

Mini Session II

6 Weeks - Dates: 06/30/99 - 08/13/99

CPE & EE Courses

CPE610-01	HIGH PERFORMANCE COMPUTING II	MTWR	4:00-5:40 p.m.
EE610-01	HIGH PERFORMANCE COMPUTING II	MTWR	4:00-5:40 p.m.

Regular Session

12 Weeks - Dates: 05/17/99 - 08/13/99

CPE & EE Courses

CPE197	Computer Methods in Engineering, C Programming
CPE302	Design of Digital Computers
CPE422	Advanced Logic Design
EE100	Concepts in Digital Signals and Systems
EE201	Digital Logic Design Lab
EE202	Introduction to Logic Design
EE300	Electrical Circuit Analysis I
EE301	Electronics Measurement Lab
EE302	Design of Digital Computers
EE303	Electrical Engineering Lab
EE305	Electronic Devices and Design
EE307	Electricity and Magnetism
EE311	Electronic Instrumentation
EE313	Electrical Circuit Analysis
EE315	Introduction to Electronic Analysis and Design
EE382	Analytical Methods in Continuous-Time Systems
EE383	Analytical Methods in Discrete-Time Systems
EE384	Digital Signal Processing Lab
EE416	Electronics II
EE420	Random Signals and
EE422	Advanced Logic Design
EE425	Introduction to Control and Robotics Systems
EE426	Communication Theory
EE500	Random Signals and Noise
EE502	Advanced Logic Design
EE505	Introduction to Control and Robotic Systems
EE506	Communication Theory
EE618	VLSI Circuits

Attention!

We are saying

Goodbye to EE311

This is your

last chance

to take EE311,

**Electronic
Instrumentation.**

(see listing below)

Search and Sight: Graduate Seminar Day

The Electrical and Computer Engineering Department will sponsor "Search and Sight: Graduate Seminar Day" for prospective graduate students on Friday, April 16, 1999.

Students will meet UAH faculty and graduate students from the ECE Department, and receive information about the graduate program, research facilities, and teaching and research assistantships.

Guests attending the event will enjoy a lunch of pizza and soft drinks. For more information about Search and Sight: Graduate Seminar Day, please call the ECE Department at 890-6316 or visit our web site:

<http://www.eb.uah.edu/ece/>

Frequently Asked Questions (FAQ) About New ECE Curricula

Question: *Can I pick and choose from parts of old and new programs?*

Answer: No, if you elect to change from an old curriculum to a new curriculum, you must follow the new program in its entirety.

Question: *What do I do if I want to change from an old curriculum to a new curriculum?*

Answer: If you have not taken any upper division courses above 300 level, check with the Office of Engineering Student Affairs in EB157 for the requirements. If you have taken any upper division courses, check with the ECE Advising Center, EB265.

Question: *I'm an EE student. What are valid EE electives?*

Answer: You may use any CPE, EE, or OPE courses, 300 or above for these. There are also two optics courses, OPT 341 and 342 which are part of the OPE program which may be used.

Question: *I understand that EE311 will not be offered by ECE Department starting Fall 1999. However, I would like to continue taking courses under the old catalog that requires EE311. What can I take in place of EE311?*

Answer: MAE311.

Question: *If I'm an EE student and I want to change over to the new curriculum, do I still have to take EE 100 even if I'm beyond my freshman year?*

Answer: Yes, you must complete the entire new curriculum, including EE100.

Question: *I understand that PHL392 will not be offered starting Fall 1999. However, I would like to continue taking courses under the old catalog that requires PHL392. What can I take in place of PHL392?*

Answer: PHL202

Question: *What are CPE electives "approved by a CPE advisor"?*

Answer: A list of suitable classes is available from the ECE Department, and is subject to change. As of the fall of 1998, the following describes the CPE electives. Refer any questions to your advisor.

Of the 9 hours of CPE electives, 3 hours may be taken from science or engineering 300-level or above. The other 6 hours must come from CPE courses 300 or above, or from the following list:

CHE 347, CS 314, CS 403, CS 487, CS 524, CS 530, CS 537, CS 545, CS 551, CS 552, CS 553, CS 555, EE 307, EE 313, EE 407, EE 411, EE 414, EE 416, EE 425, EE 426, EE 436, EE 437, EE 452, EE 461, EE 462, ISE 340, ISE 391, ISE 423, ISE 426, ISE 447, MA 415, MA 442, MA 465, MA 508, MA 515, MA 540, MA 542, MAE 478, MAE 485, MAE 489, OPE 441, OPE 442, OPE 451, OPE 454, ST 487

Question: *Why do CPE 352 and CPE 468 appear on the checksheet and not in the catalog?*

Answer: These courses will be listed in 1999-2000 catalog.

Question: *What are the prerequisites for CPE 468?*

Answer: CPE 197 and CPE/EE 302.

Question: *What are the prerequisites for CPE 352?*

Answer: CPE 203 and CPE/EE 302.

Question: *As a CPE student, can I take the senior design sequence at any time in the year?*

Answer: No, the senior design sequence, CPE 427/437, is scheduled only once a year in fall and spring.

Question: *Can I take CPE 427/437 without having had CPE 429?*

Answer: No, CPE/EE 429 is a prerequisite for CPE 427/437.

Question: *I need to take CPE 201, why can't I find it in the catalog and course schedules?*

Answer: CPE 201 no longer exists, it has been replaced by EE 201.

Question: *When do I need to apply for graduation and where?*

Answer: You need to apply for graduation six months before you plan to graduate. Apply for graduation at the Office of Student Records located in the University Center.

Question: *Do I need to talk to someone about my graduation application?*

Answer: Yes, the department will contact you when your graduation application is received to set up an appointment.

Question: *Who should I talk to if I have further questions?*

Answer: You should talk to your advisor. If you do not have an advisor, call the ECE Department at 890-6316.

Question: *Can I get a double option in Computer Engineering and Electrical Engineering at the same time?*

Answer: Right now, no, but we are looking into creating such a program.

Question: *What does it take to get a math minor?*

Answer: You must take a 400-level mathematics elective from the approved list and apply for a mathematics minor. The application and list of approved classes is available in the Office of Engineering Student Affairs.

Question: *If I quit showing up for class, will I be automatically withdrawn?*

Answer: No, if you do not withdraw by the published deadline for a semester, you continue to be enrolled in the course and the instructor has no choice but to give you an 'F' if you do not complete the work in the course.

For updated FAQ visit our homepage: www.eb.uah.edu/ece/

Publications, Presentations and Awards

CONTROL

Yuri Shtessel, Assoc. Professor

Journal Articles

"Sliding Mode Control of the Space Nuclear Reactor System," Y. Shtessel, *IEEE Transactions on Aerospace and Electronic Systems*, Vol. 34, No. 2, pp. 579-589, 1998.

"Control of "Multiple Modular DC-to-DC Power Converters in Conventional and Dynamic Sliding Surfaces," Y. B. Shtessel, O. A. Raznopolov, and L. A. Ozerov, *IEEE Transactions on Circuits and Systems*, Part I, Vol. 45, No. 10, pp. 1091-1101, 1998.

"Sliding Mode Thermal Control System For Space Station Furnace Facility," M. E. Jackson and Y. B. Shtessel, *IEEE Transactions on Control System Technology*, Vol. 6, No. 5, pp. 612-622, 1998.

"Nonlinear Nonminimum Phase Output Tracking Via Dynamic Sliding Manifolds," Y. Shtessel, *Journal of The Franklin Institute*, Vol. 335B, No. 5, pp. 841-850, 1998.

"Ramjet-Powered Reusable Launch Vehicle Control by Sliding Modes," C. Tournes, B. Landrum, Y. Shtessel and C. Hawk, *AIAA Journal on Guidance, Control, and Dynamics*, Vol. 21, No. 3, pp. 409-415, 1998.

Conference Papers

"Sliding Mode Control of the X-33 Vehicle in Launch Mode," Y. Shtessel, M. Jackson, C. Hall, D. Krupp, and N. D. Hendrix, *Proceedings of American Control Conference*, Philadelphia, June 1998.

"Continuous Sliding Mode Control, Shtessel and J. Buffington, *Proc. of American Control*

Conference, Philadelphia, June 1998.

"Actuator limit and integrator windup protection for feedback linearizable systems," J. Buffington and Y. Shtessel, *Proceedings of American Control Conference*, Philadelphia, June 1998.

"Satellite Attitude Control Using Only Magnetorquers," P. Wang and Y. Shtessel, *Proceedings of American Control Conference*, Philadelphia, June 1998.

"MIMO Sliding Mode Control of a Robotic "Pick and Place" System Modeled as an Inverted Pendulum on a Moving Cart" E. Doscocz, Y. Shtessel, and K. Katsinis, *Proceedings of 30th SSST*, 1998.

ELECTROMAGNETICS

Nagendra Singh, Professor

Conference Papers

"Electrostatic Effects in the Dynamics of Wall Defects in Liquid Crystal Optical Devices," N. Singh and W. C. Leung, *OSA Nonlinear Optics 98*, Kauai, Hawaii, August 10-14, 1998.

Research Grant

Nagendra Singh (PI) and B. E. Wells, NSF - "Kinetic Simulation of Excitation and Nonlinear Evolution of Lower Hybrid and VLF Waves in Filamentary Electron Beams in the Ionosphere," January 1999 – December 2001.

"Field Patterns of Alfvén Wave Resonance Cones," N. Singh, *AGU Fall Meeting*, San Francisco, Dec. 6-10, 1998.

"A Comparison of Results from Simulations and Observations from FAST on Auroral Electric Field Structures," N. Singh, *AGU Fall Meeting*, San Francisco, Dec. 6-10, 1998..

ELECTRON DEVICES

Fat Duen Ho, Professor

Journal Article

"Capacitor Model for a Floating Gate EEPROM Cell," Dan Yang, Robert S. Axley, and Fat Duen Ho, *Int. J. Electronics*, Vol. 84, No. 6, 561-581, 1998.

HARDWARE AND SOFTWARE ENGINEERING

William Cohen, Asst. Professor

Research Grant

W.E. Cohen, K. Kavi and B.E. Wells (PI's). NSF -CISE Research Instrumentation, March 1998-Feb 2000.

Krishna Kavi, Professor and Eminent Scholar of CPE

Research Grants

Krishna Kavi (PI), NSF, Research on Dataflow and Multithreaded Architectures, June 1998-May 1998.

Krishna Kavi (PI), NSF, Post-Doctoral Research Support, April 1998-April 2000.

Journal Publications

K.M. Kavi, "Multithreaded System Implementations," *ISMM Journal on Microcomputer Applications*, Oct 1998.

K.M. Kavi and A.R. Hurson, "Design of cache memories in dataflow architectures," *Euromicro Journal on Systems Architecture*, Vol. 44, No. 9-10, June 1998, pp 657-674.

Conference Proceedings

K.M. Kavi, A. Hernandez and D. Levine. "Hyperactive Messages," *Proceedings of the International Conference on Parallel and Distributed Computing Systems*, Las Vegas, Oct. 28-30, 1998.

Invited Presentations

Scheduled Dataflow: A synchronous execution paradigm for dataflow, University of Pisa, Italy, Sept. 15, 1998.

Multithreaded Programming: Issues and Solutions, University of Venice, Italy, Sept. 17, 1998.

A non-blocking multithreaded architecture, University of Karlsruhe, Germany, Sept 21, 1998.

Optimizing for web-based programming, Plenary Speaker at the INFOFEST-98, Budva,

Montenegro, Yugoslavia, Sept. 28, 1998.

Optimizing for web-based programming- Plenary Speaker at the INFOFEST-98, Budva, Montenegro, Yugoslavia, Sept. 28, 1998.

Other Activities

Moderator of a panel, "Stochastic Process Algebras: Where do we go now?" at the Workshop on Process Algebras and Performance Modeling (PAPM-98), Sept. 12-14, 1998, Nice, France.

Tutorial: Advanced Web-Programming, INFOFEST-98, Budva, Montenegro, Yugoslavia, Sept. 29, 1998.

Tutorial: Multithreaded programming, PDCS-98, Las Vegas, Oct. 20, 1998.

Honors:

IEEE Computer Society Certificate of Merit (for being a Guest Editor of IEEE Software Issue on Tools for Software Productivity Improvement), June 1998.

OPTICS

Gregory Nordin, Assoc. Professor

Research Grants

Continuing Research Effort for the Diffractive Optical Element Design, Nichols Research Corp., Inc., April 1, 1998 - June 30, 1999.

Initiate Diffractive Optical Element Design for Pixel Array, Nichols Research Corp., Inc., Feb. 9, 1998 - September 30, 1998.

Diffractive Optical Element Design for an Effective 256x256 Pixel Array, Nichols Research Corporation, Inc., Feb. 9, 1998 - Sept. 30, 1998.

Labor for Waveplate and Wire Grid Array Fabrication, Nichols Research Corp., Inc., March 1, 1998 - September 30, 1998.

Reactive Ion Etching, SY Technology. May 12, 1998 - September 30, 1998.

Reactive Ion Etching Service, MEMS-Optical, July 31, 1998 - September 30, 1998.

RIE Services, MEMS-Optical, Aug. 25, 1998 - September 25, 1998.

Conference Papers

"Arrays of infrared micropolarizers," G. P. Nordin, J. T. Meier, P. Deguzman, B. Barbour, M. W. Jones, in *Diffractive Optics and Micro-Optics*, Vol. 10, OSA Technical Digest Series, (Optical Society of America, Washington DC, 1998), pp. 133-135.

"Stratified diffractive optic approach for creating high efficiency gratings," D. M. Chambers, G. P. Nordin, in *Diffractive Optics and Micro-Optics*, Vol. 10, OSA Technical Digest Series, (Optical Society of America, Washington DC, 1998), pp. 43-46.

SIGNAL PROCESSING / COMMUNICATIONS

Reza Adhami, Professor and Chair

Conference Paper

"Advanced Tomographic Techniques for Target Detection and Recognition," Brian J. Smith and R. Adhami, US DOD Workshop on Detection and Classification of Difficult Targets, Huntsville, AL 1998.

Journal Articles

"Operational Vibration Specification Development of Helicopter Stores Using Wavelet Analysis," Mike Hale and Reza Adhami, Invited paper, *Journal of the Institute of Environmental Sciences and Technology*, Vol. 41, No. 5, September 1998.

"Medical Imaging and Computerized Tomography," Brian J. Smith and R. Adhami, *IEEE Potentials*, December 1998/January 1999.



Dr. Mike T. Hale
1998 Ph.D. Dissertation

Analysis and Reconstruction of Non-stationary Random Vibration Signals using Wavelet Transformations, May 1998, Mike T. Hale, employed by AMCOM.

Advisor: Dr. Reza Adhami



Dr. Brian J. Smith
1998 Ph.D. Dissertation

Localized Computed Tomography Utilizing the Wavelet Transform, August 1998, Brian J. Smith, employed by AMCOM.

Advisor: Dr. Reza Adhami

Laurie Joiner, Asst. Professor

Conference Paper

"Maximum Error Magnitude Decoding of the Golay [23,12,7] Code," Reid, W. J. III, J. J. Komo, and L. L. Joiner, *Proc. 1998 IEEE International Symposium on Information Theory*, p. 219, August 1998.

William A. Porter, Professor

Journal Articles

"Function Emulation Using MVQ Neural Networks," W. A. Porter and A. H. Abouali, Accepted by *Circuits, Systems, and Signals Processing*, 1998.

"On Neural Network Design Part I: Using the MVQ Algorithm," W. A. Porter and A. H. Abouali, Accepted by *Circuits, Systems, and Signals Processing*, 1998.

"On Neural Network Design Part I: Inhibition and the Output Map," W. A. Porter and A. H. Abouali, Accepted by *Circuits, Systems, and Signals Processing*, 1998.

SOLID STATE

Timothy Boykin, Assoc. Professor

Journal Article

"More complete treatment of spin-orbit effects in tight-binding models," Timothy B. Boykin, *Physical Review B*, vol. 57, p. 1620 (1998).

Conference Papers

"The Well-Tempered Tight-Binding Model: Many Parameters Do Not Necessarily Imply Flexibility," Timothy B. Boykin, Gerhard Klimeck, Roger Lake, and R. Chris Bowen, Presented at the *1998 March Meeting of the American Physical Society*, Los Angeles, CA, 16-20 March 1998.

"NEMO: A 1-D Heterostructure Design Tool," Gerhard Klimeck, Daniel K. Blanks, Roger Lake, Timothy B. Boykin, and R. Chris Bowen, Presented at the *1998 March Meeting of the American Physical Society*, Los Angeles, CA, 16-20 March 1998.

SEDSAT Launched on JPL Deep Space I Mission



The Students for the Exploration and Development of Space Satellite (SEDSAT) was launched as a secondary payload on a NASA Delta II launch vehicle at Cape Canaveral, Florida. SEDSAT-1 was launched from Cape Canaveral at 0808 EDT (1208 UTC) on 24-Oct-98. The launch was virtually flawless with all events happening very close to the nominal schedule. SEDSAT separated from the Delta II second stage 5303 seconds after launch over the eastern pacific.

The SEDSAT project began around 1992. It was designed and built primarily by a group of ECE engineering students and faculty at the University of Alabama in Huntsville (UAH) in close cooperation with NASA and with considerable financial assistance from private companies. SEDSAT became an international project with collaborations on a ground station and donations of equipment from the National Cheng Kung University in Taiwan, and collaboration on a panoramic imaging system with Dr. Pal Greguss of the Technical University of Budapest.

The Delta II secondary payload space was provided by NASA on the JPL Deep Space I mission. As a secondary payload SEDSAT is carried without interference to the primary mission. Although a small payload, SEDSAT will be conducting a variety of experiments. The primary objectives, like Deep Space I, are in technology studies. SEDSAT is flying an experimental panoramic imaging system that will be used to capture images of the receding Delta second stage,

and test algorithms for wide area visual attitude determination.

SEDSAT is also carrying a number of commercially derived electronics designs and new batteries provided by the NASA Marshall Space Flight Center. Once on orbit SEDSAT will serve as a worldwide amateur radio communications link, using both digital and analog repeater modes. SEDSAT will employ its panoramic and telephoto cameras with narrowband spectral filters to image the earth, atmospheric band, and cloud coverage. The resulting data will be disseminated in near real-time on the Internet to foster interest and permit the hands-on participation of science and engineering students in NASA's space activities.

SEDSAT is a 12-inch cube-shaped satellite weighing 75 pounds. It is self-contained with its own power, antenna, and telemetry systems. Gallium-arsenide-germanium solar cells cover all sides of the satellite except the bottom where SEDSAT attaches to the Delta II second stage. The solar cells provide power and charge-up the nickel-metal-hydride batteries. Magnetic torquers are used to provide de-spin and stabilization. The nominal SEDSAT orbit is 500 by 1000 km at 31.5 degrees inclination. The design lifetime is three years, although it will be in orbit considerably longer.

Updated orbital data, telemetry, and utilities for observing SEDSAT are being posted to www.seds.org



We want to hear from you!

The ECE Department looks forward to hearing your views and your success stories. Contact us to share your news and comments about your career and interests. Your story should be sent to realtime@ece.uah.edu

Real Time

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